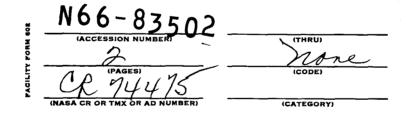Status Report No. 7

for

National Aeronautics and Space Administration Grant

NsG 280

on

THEORETICAL RESEARCH ON THE PERIODIC MOTION AND STABILITY

OF A SMALL MASS UNDER THE GRAVITATIONAL ATTRACTION OF

TWO HEAVY BODIES

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STATUS REPORT NO. 7

Research on asymptotic and asymmetric periodic solutions of the 3-body problem has been concluded, and computed results on several new classes have been processed and prepared for publication.

After discovering small errors in the Illiac II program for studying stability of the cubic equation $d^2x/dt^2 + p(t)x^3 = 0$ (where $p(t)$ is a square-wave function of time), the program was revised and corrected.

Latest results of this new program are being compared with the predictions of the theory of Arnol'd and Moser. Invariant regions appear to exist, but detailed studies now being made must be completed before their existence can be definitely verified. Once this is finalized, application will be made to the restricted problem of three bodies.